Techniques of Nanoscale Silicon Texturing of Solar Cells

Summary

The texturing process with mc-Si (multi-crystalline Silicon) creates RIE (Reactive Ion Etching). The texture of the cells is more effective in solar absorption and, therefore, storage of energy. This nanoscale texturing is also a cost effective and environmentally safe tool for a renewable energy source.

The metal catalyst process used allows for random distribution of surface features which create an anti-reflective surface. The techniques with RIE and metal catalysts will yield improvements to optical performance of silicon cells by having dimensions comparable (or smaller) than solar wavelengths.

BENEFITS

- Cost effective
- “Green” technology
- Renewable energy
- Process is non-toxic

APPLICATIONS

- Energy storage
- Use in solar panels and harnessing solar power
- Alternative energy developments

PATENTS ISSUED

- 6329296 (US)
- 3855105 (Japan)
- 1316115 (Europe)

SD#

- 6442.0
- 6442.1
- 6442.2
- 6442.3

INTELLECTUAL PROPERTY & LICENSING CONTACT

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Technology Readiness Level:

Sandia believes this technology can best be equated with a TRL 3 in which active research and development has been initiated. This includes analytical and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.

Licensing & Partnering Status:

Various license and partnering options are available. Please contact the Intellectual Property department to discuss. This is a valuable technology for a potential licensee or partner who wishes to expand on the existing technology and research for commercial use.

National Nuclear Security Administration

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